

Abstract for Poster or Invited Talk

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ABSTRACT:

Numerical calculations indicate that isothermal gas clouds, with prolate spheroidal geometries, may fragment if they initially collapse down onto their symmetry axis to form a self-gravitating spindle. Such a configuration is known to be dynamically unstable to the growth of subcondensations.

This paper describes numerical calculations of the collapse and fragmentation of prolate clouds which have a small component of rotation about one of their short axes. It is found that having initially collapsed to a spindle, the clouds generally fragment into three dominant subcondensations, one located at the cloud centre of mass, and one located on either side of the cloud centre. Due to the relatively low rotational velocity of the cloud, the two out-lying fragments fall towards the cloud centre, and undergo a close three-body encounter. This results in either the merger of all three objects, leaving a single, rotationally supported disk, or in the merger of the central object and one of the more out-lying fragments, resulting in the formation of a 'binary system' consisting of two rotationally supported disks. In the latter case, wide variations may occur in the orbital separations and eccentricities due to the essentially chaotic nature of the initial three-body encounter. Tidal interactions at pericentre are found to result in the transfer of spin angular momentum from the disks to the orbit, leading to an increase in binary separation. This effect is compounded by the ongoing accretion of material possessing high specific angular momentum from the nascent cloud. It therefore seems unlikely that the binary systems thus formed will merge at later times.

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